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G.R. TYPE 1307A TRANSISTOR OSCILLATOR

PROPERTY
OF
METERS AND STANDARDS

SPECIFICATIONS

Output Frequency:	400 and 1000 cps ±3% at 2-volt ou put into 600-ohm resistive load. Fre quency decreases slightly with increas in output level. A reactive load wi shift the frequency, since the load i coupled directly into the tuned circui
Output Voltage:	Adjustable, with a maximum of 2 volt into a 600-ohm load.
Distortion:	Less than 5% at 400 cps (2 v int 600-ohm load); less than 6% at 100 cps (2 v into 600-ohm load)
Voltmeter:	0-3 v ac, calibrated directly in volt at output terminals.
Output Circuit:	21-inch coaxial output cable terminate in Type 274-MB double plug, with r connection to instrument case.
Batteries:	Three mercury A batteries (Mallo RM-1 or equivalent), supplied.
Transistor:	One P-N-P junction transistor (RC Type 2N105 or equivalent).
Mounting:	Black-finished aluminum case.
Accessory Available:	Type 1555-P1 leather carrying cas with strap.
Dimensions:	Length 6 in., width 3-1/8 in., dep 2-1/2 in., over-all, excluding outp cable.
Weight:	1 lb, 14 oz.

OPERATING INSTRUCTIONS

TYPE 1307-A

TRANSISTOR OSCILLATOR

Form 841-D
March, 1958

GENERAL RADIO COMPANY

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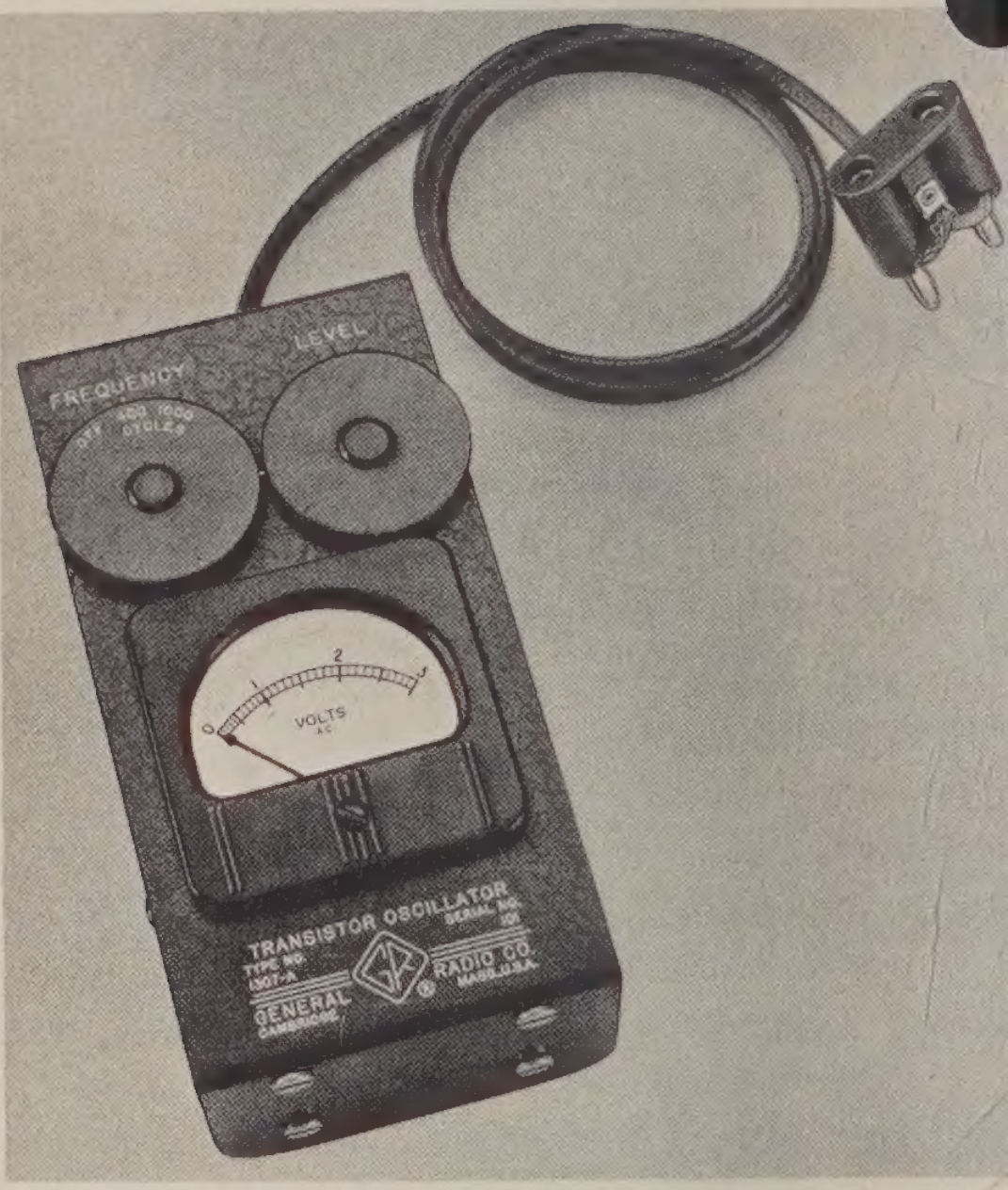

Figure 1. Panel View of
Type 1307-A Transistor Oscillator.

TYPE 1307-A
TRANSISTOR OSCILLATOR

1 INTRODUCTION.

1.1 PURPOSE. The Type 1307-A Transistor Oscillator (Figure 1) is a pocket-size signal source of 400 or 1000 cycles, useful as a power source for the Type 1552-B Sound-Level Calibrator or Type 546-C Audio-Frequency Microvolter. It is also useful in continuity checks of audio systems, in setting operating levels, in checking sensitivity of oscillographs, in making preliminary calibrations of electronic systems, and as a power source for bridge measurements at 400 and 1000 cycles.

1.2 DESCRIPTION. The Transistor Oscillator is housed in a 6 by 3-1/8 by 2-1/2 in. aluminum case. On the panel are the FREQUENCY selector switch, the LEVEL control, and a 0 - 3-volt meter to indicate output voltage. The output connector is a Type 274-MB Double Plug at the end of a 21-inch coaxial cable.

1.3 ACCESSORIES. Supplied with the Transistor Oscillator are three Mallory Type RM-1 batteries. Available on order from General Radio Company is a Type 1551-P1 Leather Carrying Case, including strap.

2 PRINCIPLES OF OPERATION.

A Type P-N junction transistor is connected in a Hartley oscillator circuit as shown in Figure 2. In Figure 2, the FREQUENCY switch (S1) is shown in the 1000-cycle position, in which the tuning inductor (T1) is tapped for this frequency. In the 400-cycle position, the entire winding is used, resulting in a 400-cycle tuned circuit.

An additional winding on T1 supplies the output load. A rectifier-type voltmeter connected across this winding indicates the voltage at the output terminals.

A germanium-rectifier biasing circuit is used to insure proper starting of the oscillator over a wide temperature range.

3 OPERATING PROCEDURE.

3.1 GENERAL. Operation of the Transistor Oscillator consists merely of attaching the output connector to whatever is to be fed, setting the FREQUENCY switch to the desired frequency, and setting the LEVEL control so that the desired output voltage is indicated on the meter. To disconnect the batteries and thus turn off the oscillator, turn the FREQUENCY switch to OFF.

3.2 VOLTMETER ERROR. The voltmeter is an average, rectifier-type meter calibrated to indicate directly the voltage at the output terminals. For a sine wave, the indication at 2 volts is the rms value ±3% at 25 °C. The temperature coefficient is about +0.06% per degree C. Thus, for a 2-volt o

t at 0°C, the LEVEL control should be set so t the meter indicates 1.97 volts. A waveform error, which may be as much as the percentage harmonic content of the oscillator, is also possible.

3.3 LOAD IMPEDANCE. The oscillator is designed for a 600-ohm load impedance, but will operate with a higher load impedance with some increase in distortion. At a load impedance much lower than 600 ohms the circuit may stop oscillating.

Frequency is practically independent of load if the load is resistive. A reactive load, however, will affect frequency, since the load is coupled directly into the tuned circuit. For instance, a 1-μf capacitor connected across the output terminals will shift the 400-cycle output down to about 365 cycles. Similarly, a 0.1-μf capacitor connected across the output terminals will shift the 1000-cycle output down to about 980 cycles.

3.4 USE WITH TYPES 1552-A AND 1552-B SOUND-LEVEL CALIBRATORS. When the Transistor Oscillator is used with the Type 1552-A Sound-Level Calibrator, the nominal 400-cycle frequency is shifted to about 370 cycles because of the capacitance in the calibrator. The sound-pressure level produced by the calibrator with a 2-volt input is then 1.3 db less than the rated value at 400 cycles. There is no appreciable frequency shift when the Transistor Oscillator is used with the Type 1552-B Calibrator.

4 SERVICE AND MAINTENANCE.

4.1 GENERAL. This service information sho enable the user to correct ordinary difficulties resulting from normal use. Major service problems should be referred to our Service Department, which will cooperate as much as possible by furnishing information and supplying replacement parts needed. When notifying our Service Department of any difficulties in operation or service of the instrument, please mention the serial and type numbers. Also report the trouble encountered, as well as any other pertinent information concerning the use of the instrument and steps taken to eliminate the trouble.

Before returning an instrument for repair, please write to our Service Department, requesting a Returned Material Tag, which includes shipping instructions. Use of this tag will insure proper handling and identification when an instrument or parts are returned for repair. A purchase order covering repair of material returned should also be forwarded to avoid unnecessary delay.

4.2 BATTERY REPLACEMENT. Three mercury batteries are used in the oscillator. If the maximum output is less than two volts with a 600-ohm load, replace these batteries.

To replace batteries, first loosen the two screws on each side of the case and remove the back of the instrument. The batteries are held in place in the plastic tube at the top of the instrument. Using a screwdriver, unscrew the end cap of this tube. Remove the batteries and insert replacements with the flat ends put in first to insure correct polarit

Then replace the end cap so that it is finger-tight. [illegible]tteries should last about 100 hours at eight hours [illegible] day.

4.3 TRANSISTORS. If the transistor must be replaced, make sure that the orientation in the socket is correct, as shown in Figure 2. Most P-N-P junction-type transistors having the characteristics of RCA 2N105 or Raytheon 2N131 types will operate satisfactorily in the circuit. Some variation in output and distortion can be expected from transistor to transistor.

The following d-c voltages were measured between transistor socket terminals and battery positive terminal with a General Radio Type 1800 Vacuum-Tube Voltmeter (10-megohm input connection), and with a 2-volt oscillator output with no load connected:

Emitter -0.1; Base -0.15; Collector -3.0.

4.4 PARTS LIST

B1	BATTERY, Mallory Type RM-1	
B2	BATTERY, Mallory Type RM-1	
B3	BATTERY, Mallory Type RM-1	
C1	CAPACITOR, Wax, 1.0μf ±10% 100dcwv	COW-17
C1A	CAPACITOR, Wax (value determined in GR lab so that C1 plus C1A equal 1.075μf ±2-1/2%)	COW-17
C2	CAPACITOR, Electrolytic, 100μf 20dcwv	COE-35 + COES-1, 1-5/8
C3	CAPACITOR, Electrolytic, 50μf 15dcwv	COE-47
D1	CRYSTAL RECTIFIER	1N34-A
M1	METER, 0-3v ac	MEDS-66
R1	RESISTOR, Composition, 3k ±5% 1/2w	REC-20BF
R2	RESISTOR, Composition, 27Ω ±5% 1/2w	REC-20BF
R3	RESISTOR, Variable, 5k ±10%	1307-40
R4	RESISTOR, Composition, 300Ω ±5% 1/2w	REC-20BF
S1	SWITCH, Rotary	SWRW-104
T1	TRANSFORMER	746-426
TR1	TRANSISTOR, RCA Type 2N105, Raytheon Type 2N131, 2N132, or equivalent	

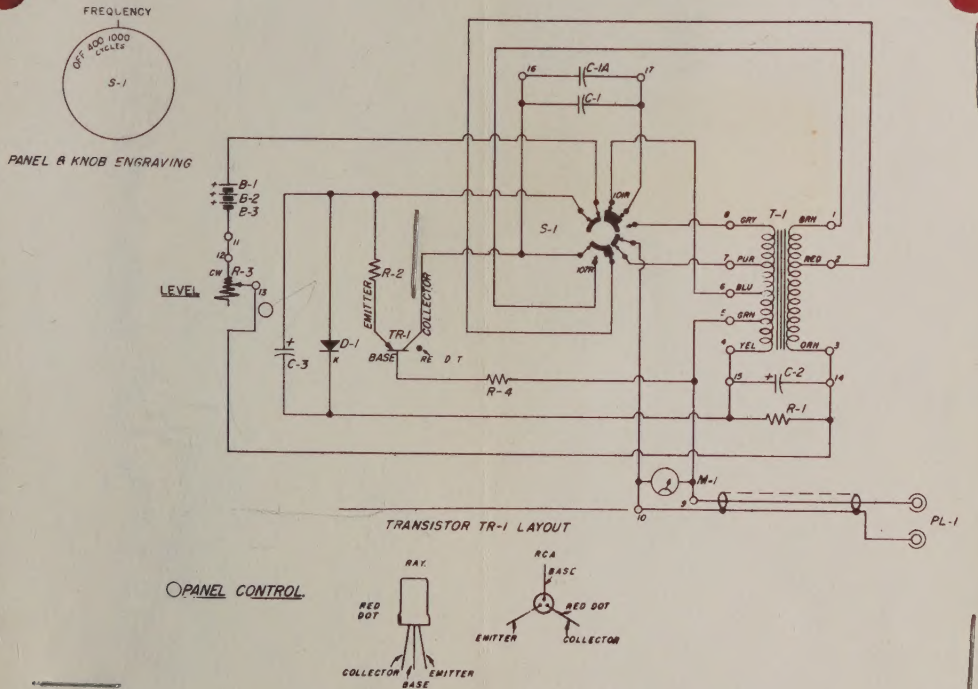

Figure 2. Wiring Diagram for Type 1307-A Transistor Oscillator.

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